

CHAPTER 10

PUBLIC BODY

The Hong Kong Housing Authority

GOVERNMENT DEPARTMENT

Housing Department

Management of public housing construction

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MANAGEMENT OF PUBLIC HOUSING CONSTRUCTION

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MANAGEMENT OF PUBLIC HOUSING CONSTRUCTION

Summary and key findings

A. **Introduction.** The Housing Authority (HA) is responsible for implementing the public housing programme through its executive arm, the Housing Department (HD). The massive scale of housing construction in recent years has put heavy pressure on the HD. Recently, poor workmanship in some public housing projects has aroused public concerns. To address the public concerns, the HA has initiated a number of reforms to enhance the quality of public housing (paras. 1.2 to 1.4).

B. **Audit review.** Audit has conducted a review to ascertain if there is room for further improvement in the management of construction projects (para. 1.5). The audit findings are summarised in paragraphs C to L below.

C. **Low efficiency ratio.** The efficiency ratios (ERs) of the HA's standard designs for Home Ownership Scheme (HOS) courts are generally lower than those of buildings designed by private-sector developers. The lower ERs are mainly caused by the fact that the floor areas provided for common areas, such as lift lobbies and circulation areas, are more generous. The private-sector developers adopt features in designs that are more efficient, contributing to a higher ER. Audit considers that there are substantial benefits to the HA and to the community by increasing the ER of the HA's HOS courts, while maintaining a reasonable living environment. Similar benefits can also be achieved by increasing the ER of public rental housing estates (paras. 2.2 to 2.16).

D. **Slow progress in implementing new tendering system.** In September 1999, the HA introduced the Preferential Tender Award System for the award of building contracts to guard against accepting a low bid submitted by contractors who had performed poorly in the past. Apart from the tender sum, the past performance of tenderers is also taken into account. In January 2000, the HA agreed to extend the System to cover building services and piling contracts. However, the progress has been slow. This was mainly due to the lack of a performance scoring system for these contractors (paras. 3.3 to 3.9).

E. **Short probationary period for contractors.** In November 1997, the HA shortened the probationary period of building contractors on its approved lists from 18 to 12 months. The objective was to ensure that there would be competition among a sufficiently large number of contractors. Audit notes that the normal completion time for a building project is about 27 months. The 12-month probationary period is too short for determining whether the contractor is competent enough for promotion to the confirmed status. In this connection, the Works Bureau requires a probationary contractor to undergo a minimum probationary period of 24 months (paras. 3.13 to 3.15).

F. **Improvements needed in piling works.** Foundation problems discovered since 1999 have exposed the weaknesses inherent in the piling process and the monitoring system. It also raised concerns over the use of pre-stressed precast concrete (PPC) piles. Audit examination of two PPC piling projects shows that using PPC piles at sites, where the geological conditions are known to be difficult, requires close supervision. In examining the third PPC piling project, Audit considers that effective measures should have been taken to ensure that the installation and testing of preliminary piles were completed before the beginning of the actual piling works (paras. 4.2 to 4.21).

G. **Specific guidelines required for different types of piles.** As far as approving foundation designs is concerned, the HD and the Buildings Department (BD) are performing a similar role of regulatory agency. Both departments have issued technical manuals to provide guidance to their staff for approving designs submitted. However, unlike the BD's manual, the HD's manual does not provide specific guidelines to deal with different types of piles (paras. 4.24 to 4.28).

H. **Delays in introducing the new contractor performance monitoring system.** The HD uses a Performance Assessment Scoring System (PASS) to monitor the performance of the HA's contractors. In May 1999, the HA gave approval to revise the PASS and to fully implement the new PASS 2000 by January 2000. The HD later revised the target implementation date of the PASS 2000 to June 2001. The HA was only informed of the delay in April 2000 (paras. 5.2 to 5.9).

I. **Large quantity of paper work for site inspections.** The HD uses a manual system to record site inspection results which are submitted to the HA Headquarters monthly. Site inspections are conducted for each type of works on each floor of the buildings. In general, 40 types of works are involved on each floor. In a 35-floor block, some 1,400 inspection forms have to be completed. Such a large quantity of paper work and form-filling could adversely affect the efficiency and effectiveness of site inspections. In May 1999, the HA agreed to develop a new computerised system for site inspections. However, little action has since been taken by the HD (paras. 5.12 to 5.17).

J. **Delays in handing over of new flats.** Under the current practice, the HD's Development and Construction Branch carries out the first final flat-to-flat inspection and the Management Branch conducts the second final inspection before newly completed flats are handed over to occupants. In a random examination of five projects completed in 1999-2000, Audit found that the two final flat-to-flat inspections by separate teams delayed the occupation of the new flats by 1.5 months on average. Audit has estimated that such delays could have cost the HA \$117 million in terms of rental and interest forgone in 1999-2000 (paras. 5.21 to 5.25).

K. **Conflicting roles of the HA.** The HA has been playing different roles for development of public housing projects, i.e. as developer, project manager and supervisor professional, and also as regulatory agency. In April 2000, after consulting the public on the issue, the HA agreed to implement the initiative of putting the HA building projects within the purview of the Buildings

Ordinance (BO — Cap. 123). However, the HA has not established any target implementation date for this initiative (paras. 6.2 to 6.7).

L. **Quality housing reform.** In April 2000, the HA endorsed a two-phased implementation plan containing 50 improvement initiatives to enhance the building quality. However, Audit notes that the HD has not set implementation dates for 23 of the 50 initiatives. Moreover, in view of far-reaching consequences of the various initiatives, Audit considers that a reporting system should be established to ensure that the initiatives implemented are periodically reviewed and that feedback from various parties concerned is obtained (paras. 7.2 to 7.5). Furthermore, Audit is of the view that the HA should emphasise that providing quality housing to the public is one of its core values, and should inculcate its staff with the importance of quality housing (paras. 7.7 to 7.10).

M. **Audit recommendations.** Audit has made the following major recommendations that the Director of Housing should:

- (a) take prompt action to improve the ERs by revising the block layout plan, and critically re-examine the floor plans of core and circulation areas of the current standard designs (first and second insets of para. 2.17);
- (b) accord priority to the implementation of the performance scoring system for building services and piling contractors (first inset of para. 3.10);
- (c) critically review the appropriateness of the existing 12-month probationary period for newly-listed building contractors, and consider extending the probationary period (first and second insets of para. 3.16);
- (d) develop an effective mechanism for the monitoring of piling contracts and improve working procedures by requiring site staff to properly document and notify the senior management of significant problems encountered (first and second insets of para. 4.22);
- (e) ensure that the installation and testing of preliminary piles are completed at the initial phase of piling projects (third and fourth insets of para. 4.22);
- (f) issue specific guidelines for different types of piling works, particularly for foundation works that use PPC piles (second inset of para. 4.29);

- (g) take actions to ensure that the PASS 2000 is implemented as soon as possible, and inform the HA on a timely basis of any delays that may affect the implementation of major management control systems (first and second insets of para. 5.10);
- (h) draw up an action plan for the development and implementation of a computerised system for site inspections (first inset of para. 5.18);
- (i) consider combining the two final flat-to-flat inspections, so as to ensure that new flats are handed over to the occupants immediately after their completion (second inset of para. 5.26);
- (j) draw up an implementation plan for putting all the HA building projects within the purview of the BO, and periodically review the progress and report to the HA (first and third insets of para. 6.8);
- (k) set target implementation dates for all the quality housing reform initiatives to ensure effective monitoring, and establish a management system to monitor progress and to obtain feedback from various parties concerned (first and second insets of para. 7.5); and
- (l) include the provision of quality housing as one of the core values in the mission statement of the HA Corporate Plan, and take positive action to promote this core value so as to ensure that it is recognised and accepted by all staff concerned (first and second insets of para. 7.10).

N. **General response from the Director of Housing.** The Director of Housing has said that most of the audit findings and recommendations are, in general, agreeable to the HD. In fact, the HA/HD have been taking positive actions to address the issues and are making good progress.

O. **General response from the Chairman, HA.** The Chairman, HA has said that he considers Audit's findings a very useful reference for improving the HA's work. He has also said that Audit's recommendations will be carefully considered by the HA, and will be put into implementation wherever practicable.

PART 1: INTRODUCTION

1.1 Over the past four decades, Hong Kong has undertaken one of the largest public housing programmes in the world. With the rapid population growth and the economic development, public housing in Hong Kong has developed from the initial concept of providing basic shelters for the homeless in the 1950s to the provision of well designed, good quality housing to meet today's needs.

1.2 The Housing Authority (HA) is responsible for implementing the public housing programme through its executive arm, the Housing Department (HD). To date, the HA has built about a million public housing flats accommodating nearly half of the population.

1.3 The HA has entered a period of peak activities which is expected to be carried through for the next few years. According to the HA's latest business plan, in the year 2001-02 a total of 192,000 new housing flats would be at different stages of development, with 147,000 flats under construction.

1.4 The massive scale of housing construction in recent years has put heavy pressure on the HD. Recently, poor workmanship in some public housing projects has aroused public concerns. To address the increasing public concerns, the HA has initiated a number of reforms with a view to building a partnership for progress and achieving a quantum improvement to quality and safety standards in the construction of public housing. These initiatives include providing quality products and services to customers, revamping the piling process, reinforcing site supervision and other quality improvement measures. Appendix A is a summary of the initiatives introduced by the HA.

Audit review

1.5 Against the above background, Audit has recently conducted a review of the HA's construction of public housing. The objective of the review is to assess the system of managing the construction process and to ascertain if there is room for further improvement in the management of construction projects. Audit has observed that improvements can be made in the following areas:

- (a) standard designs of the HA's housing blocks (see paragraphs 2.1 to 2.17 below);
- (b) tendering process (see paragraphs 3.1 to 3.16 below);
- (c) piling works (see paragraphs 4.1 to 4.29 below);

- (d) monitoring the performance of contractors (see paragraphs 5.1 to 5.26 below);
- (e) different roles of the HA (see paragraphs 6.1 to 6.8 below); and
- (f) quality housing reform (see paragraphs 7.1 to 7.10 below).

General response from the Director of Housing

1.6 The **Director of Housing** has said that most of the findings and recommendations in the audit report are, in general, agreeable to the HD. In fact, the HA/HD have been taking positive actions to address the issues and are making good progress.

General response from the Chairman, HA

1.7 The **Chairman, HA** has said that:

- (a) he considers the Audit findings a very useful reference for improving the HA's work and he shares the views of the Director of Housing put forward in his response to the Audit findings and recommendations;
- (b) the quality of public housing and indeed the problems that have long existed in the local construction industry have, in the past year or so, attracted much public attention. The HA, the HD as well as other stakeholders of public housing development are well on course to reforming the housing production process. The HA's improvement package includes 50 initiatives that cover almost all aspects of the process. The HA is making good progress; and
- (c) the Audit recommendations will be carefully considered by the HA, and will be put into implementation wherever practicable.

PART 2: STANDARD DESIGNS OF HA'S HOUSING BLOCKS

2.1 This PART examines the current standard block designs adopted by the HA and, in particular, the efficiency ratio (ER) being achieved by using these standard designs.

2.2 In residential property development in Hong Kong, the ER for a residential site is generally recognised as the ratio between the saleable area (SA) and the gross floor area (GFA) and is expressed as a percentage. According to the Code of Measuring Practice issued by the Hong Kong Institute of Surveyors, the SA of a unit comprises the floor area exclusively allocated to that unit, but excludes the common areas such as staircases, lift shafts, lobbies and common corridors.

2.3 The GFA of a building, on the other hand, is calculated in accordance with the statutory definitions provided in the Building (Planning) Regulations and the Practice Notes for Authorised Persons. According to the Code of Measuring Practice, the GFA is defined as the area contained within the external walls of a building measured at each floor together with the area of each balcony.

2.4 For any given site, the allowable development ratio (or plot ratio) is fixed, which in turn determines the maximum GFA that can be built. It follows that the higher the ER, the higher will be the SA relative to the GFA. In the private sector, developers try to maximise the ER of their developments, because a development with high ER usually provides more SA, which is for the exclusive use of the occupants. Residential developments with higher SA are usually more marketable than those with low SA.

2.5 Therefore, in private-sector developments, common areas (such as common corridors and staircases) are normally kept to the minimum in both number and size, provided that the regulations laid down by the Building Authority and the Fire Services Department are complied with.

2.6 The HA obtains its land free of charge from the Government for public rental housing projects. In respect of Home Ownership Scheme (HOS) projects, the land premium paid by the HA is fixed at 35% of the development costs of the HOS projects concerned. A high ER provides more usable floor area and therefore more flats could be constructed to accommodate more people in need. Building more flats to house more people is desirable because land is a scarce resource in Hong Kong.

Standard block designs

2.7 Public housing blocks have generally been built using the standard block designs. Over the years, various standard designs have been used for public rental housing (PRH) estates and HOS courts. The three most frequently used standard block designs are the **New Cruciform** (for HOS), the **Harmony One** (for rental housing) and the **Concord** (for HOS).

2.8 ***New Cruciform design.*** The New Cruciform design was introduced in 1984 and the first blocks were completed some three years later in 1987. Since its introduction, this design has mainly been used for building the purposely designed HOS courts. The floor layout of New Cruciform design is like a cross with four arms extending from a central core containing lifts, services and stairs. There are ten flats on each floor. A typical layout is shown in Appendix B.

2.9 ***Harmony One design.*** The Harmony One design was introduced in 1989. They are primarily used for rental housing estates, some of which have been upgraded to become HOS courts. The floor layout of Harmony One design is a similar cruciform arrangement with four arms extending from a central core. The number of flats on each floor can vary from 16 to 20, depending on the required flat mix. There may be four or five flats on each arm. The design's typical layout is shown in Appendix C.

2.10 ***Concord design.*** The Concord design was introduced in 1995 for HOS courts. Compared with the New Cruciform design, the Concord design is more modern in terms of standards and finishes. It also provides a greater degree of flexibility for mechanised construction and off-site production of components of the building. A typical Concord block is a block with eight flats on each floor as shown in Appendix D.

Audit analysis

2.11 The ERs for the New Cruciform, Harmony One and Concord designs do not readily show whether the HA has made optimal use of the land allocated to it for public housing development. In order to assess whether, in terms of the ER, the standard designs adopted by the HA are as efficient as the designs used by private-sector developers, Audit randomly selected for examination a number of HOS projects designed and completed by the private-sector developers under the Private Sector Participation Scheme (PSPS — Note 1), and a recently completed private residential project. Audit compared (Note 2) the ERs of the HA's standard designs for HOS courts with the ERs of the residential projects developed by these private-sector developers. The results of the comparison are shown in Table 1 below.

Note 1: *The PSPS was introduced in 1978 to provide private-sector developers an opportunity to contribute their expertise towards public housing projects. The specification and unit price of the HOS flats built under the PSPS are stipulated by the Government and are similar to those built by the HA.*

Note 2: *The comparison does not include the Harmony One design because this design is essentially for PRH and has up to 20 flats per floor. The number of flats on each floor of a Harmony One block is much greater than that of private-sector or PSPS blocks which normally have no more than 10 flats per floor.*

Table 1
Comparison of ERs of HA's standard designs and
ERs of PSPS projects and a private-sector residential development

Building project	Saleable Floor Area	Gross Floor Area	Average ER (measured on a per-floor-basis)
	(sq. ft.) (Note 1)	(sq. ft.)	
<i>HA's HOS courts</i>			
Tak Keung Court, Lok Fu (New Cruciform)	404 to 656	509 to 823	81.5%
Ching Wang Court, Tsing Yi (Concord)	506 to 650	687 to 883	78%
<i>PSPS project/private-sector developer</i>			
Aldrich Garden, Shau Kei Wan	430 to 592	505 to 764	85%
Grandview Garden, Diamond Hill	412 to 587	483 to 687	86%
Rhythm Garden, Choi Hung	430 to 591	506 to 693	86%
			} (Note 2)
<i>Private-sector project</i>			
Laguna Verde, Hung Hom	380 to 430	467 to 610	82%

Source: HD's records and sales brochures of developers

Note 1: Despite the official adoption of metric units in Hong Kong, it is still common to use British units of measurement when referring to the SA or GFA of a flat. For easy reference, one square foot equals 0.0929 square metres.

Note 2: These figures are corroborated by the findings of a report (produced in July 2000 by the Department of Real Estate and Construction of the University of Hong Kong) that the average ER of PSPS courts built since 1980 was 86.7%.

Audit observations on standard designs

2.12 Audit notes that the ERs (78% and 81.5%) of the HA's standard block designs are lower than those (82% to 86%) of buildings designed by private-sector developers. The comparatively lower ERs of the HA's standard designs are mainly caused by the fact that the floor areas provided for common areas, such as lift lobbies and circulation areas, are much more generous than those provided in PSPS and private-sector developments. For example, in Ching Wang Court of the HA (a 36-storey HOS court with **288 flats** per block using the Concord design with eight flats on each floor), there are four lifts and two staircases which have taken up a floor area of about **540 sq. ft.** on each floor (see Appendix D). However, in Rhythm Garden (a 29-storey PSPS development with **290 flats** per block designed by the private sector with 10 flats on each floor), there are only three lifts and two staircases on each floor (see Appendix E). The floor area taken up by the lift and staircase is only about **450 sq. ft.**, i.e. 17% less than that used in Ching Wang Court.

2.13 By comparing the HA's standard designs with the layout design of other private-sector developments, Audit notes that there are certain features in the designs adopted by the private sector that contribute to more efficient land use, resulting in a higher ER. Examples of these features are as follows:

- (a) scissors-design of escape staircases requiring less floor area;
- (b) central core design with short branch corridors; and
- (c) in the HA's designs for housing blocks placed on top of a podium, the central core (which contains usually the lifts and staircases) of each block is constructed in such a way that the entire central core reaches the street level, and lift stops are provided to the intermediate floors of the podium block. However, in a typical private-sector design, the lifts usually reach the street level directly. Lift stops are not provided to the intermediate floors of the podium block.

2.14 In the HOS blocks constructed by the HA, the lower ERs mean that the land allocated to the HA has not been utilised in the most optimal way in terms of maximising the SA. For a given site, the number of flats built is smaller.

2.15 Audit considers that there are substantial benefits to the HA and to the community by increasing the ER of the HA's HOS blocks, while maintaining a reasonable living environment. In 1999-2000, the total GFA built for HOS courts was about 10,900,000 sq. ft. **Audit has estimated that, for every one percentage point improvement in the ER, the HA could build an additional 138 HOS flats (Note 3).** Similarly, there are considerable benefits if the ER of PRH estates can

Note 3: $138 \text{ HOS flats} = 109,000 \text{ sq. ft. (i.e. 1\% of total GFA built for HOS courts in 1999-2000)} \div 790 \text{ sq. ft. (average GFA of an HOS flat)}$.

also be improved without affecting the living environment. This is because every one percentage point improvement in the ER could produce an additional 217 flats (Note 4).

2.16 Audit notes that the HA has agreed to consider using more non-standard designs. Consultants from the private sector will be employed to provide future non-standard designs. Audit welcomes this initiative. **In order to ensure that the future designs achieve a high ER, Audit considers that it is desirable to establish an ER standard so as to enable the HA to benchmark its housing block designs against the designs of the similar residential developments of the private sector.**

Audit recommendations on standard designs

2.17 **Audit has recommended that the Director of Housing should:**

- **take prompt action to improve the ERs of the HA's housing blocks by revising the block layout plan, in particular the design and floor area of common areas;**
- **critically re-examine the floor plans of the core and circulation areas of the current standard designs for HOS and PRH blocks with a view to identifying any inefficiencies in building design and site use. In doing so, comparison should be made with the design and layout plans of similar developments of the private sector; and**
- **consider setting standards for future new HA designs, so as to enable the HA to benchmark its housing block designs against the ERs used in the developments of reputable private developers.**

Response from the Administration

2.18 **The Director of Housing** has said that:

- (a) the HA has already agreed to pursue more non-standard designs and some are now under advanced planning stages. Non-standard designs are being prepared by in-house HD project teams as well as by external consultants;

Note 4: *217 rental flats = 130,000 sq. ft. (i.e. 1% of total GFA built for PRH estates in 1999-2000) ÷ 600 sq. ft. (average GFA of a PRH flat).*

- (b) scissors-design staircases are commonly used in private-sector designs but have limitations in travel distances and buildability when compared to a symmetrical central core. Scissors-design staircases are now being used in some of the HA's non-standard HOS designs where appropriate (Note 5);
- (c) the HA will continue to adopt designs of public areas in its buildings, which offer a good utilisation of space, natural ventilation and natural lighting and which achieve environmental standards in tune with current trends;
- (d) podium design is not very common in public housing developments. The quoted HOS project is on a very small site with a podium up to the boundaries and the lobby at the ground level is necessary. In some HA projects where podium design is used, the lift cores stop at podium level and residents are carried to ground level by transfer lifts;
- (e) the HA has made a conscious decision to provide better public areas, which are well lit and well ventilated and to enable persons on wheelchairs to use the areas with ease. In doing so the HA has, by necessity, adopted lower ERs in some of its buildings than the private-sector practice. It is not considered that the public areas are over-provided in the HA buildings;
- (f) the high ERs quoted in PSPS projects and some private-sector developments have led, in general, to unsatisfactory public spaces within these buildings which are very cramped and neither well ventilated by natural means nor naturally lit. The ER in PSPS projects has been capped at 86% since 1988 as some of the PSPS developers were achieving even higher ER figures at the expense of lowering the quality of the public areas;
- (g) there are more lifts in HOS projects than in PSPS projects because the HOS blocks are higher, up to 40 domestic storeys, whereas a PSPS block is generally 30 to 35 storeys high. The number of lifts is determined by the traffic criteria of the lifts, the waiting times and handling capacity of the lifts. The HOS lift service standards are not excessive and compare favourably with the standards adopted in private developments. Heights of buildings and the number of lifts impact directly on the ER and on the quality of external spaces in the development. PSPS developments have been characterised in the past as relatively low blocks with less landscaped area, simply because the development process encourages faster construction;

Note 5: Audit welcomes the HD's move to use scissors-design staircases in some of the HA's HOS designs. The use of scissors-design staircases requires less floor area and will improve the ERs of the buildings concerned.

- (h) a joint Practice Note for Authorised Persons will shortly be issued by the Buildings Department (BD), Lands Department and Planning Department on measures to improve the quality of public spaces in residential buildings e.g. sky gardens, provision of more generous public areas and balconies. These measures will effectively reduce the ER. (Audit note: The Practice Note has recently been issued. The ER of private projects will not be affected — see paragraph 2.20 below.) The intention is to offer bonus GFA subject to satisfying certain criteria. The HA has been intentionally providing more generous public areas in public housing blocks for many years;
- (i) ERs in HOS blocks are in the order of 80% for a block with 10 flats per floor and are comparable with similar developments by the private sector. However, an ER of 80% in PRH with a much larger number of flats per floor is not likely to be achievable. In view of the proposals set out in the proposed joint Practice Note for Authorised Persons, it is reasonable to expect to see a reduction in the actual ER in private-sector blocks in future;
- (j) in particular, ER is not the only factor that dictates the number of flats produced on any given site. Population and flat production for public housing were previously determined by a Planning Brief, and more recently by a set of development parameters prepared through a government consultative process which sets the requirements for the estates in accordance with Hong Kong Planning Standards and Guidelines. The design of public housing does not follow the same procedures as private developments;
- (k) the emphasis in public housing projects is on the provision of an adequate flat mix for a specific population. The Planning Brief/development parameters define the population, the number of flats, the number and areas of supporting facilities such as welfare and shopping, number of car-parking spaces and areas for recreation. Population and flat number are critical parameters because they are limited by infrastructure provision such as sewerage, drainage, water supply and the road network; and
- (l) as there are practical difficulties in producing a design to match all parameters together, some flexibility is allowed in the parameters to obviate the need to further amend the brief and resubmit to the District Planning Conference should the design deviate slightly from the brief. In some of the HA developments, the number of flats produced had exceeded the number specified in the brief by making use of the flexibility. The potential of a site has already been maximised when the requirements of the Planning Brief/development parameters have been met. Increasing the ER does not necessarily mean an increase in the number of flats but only leads to marginally smaller buildings and marginally lower construction cost. Instead, the HA has chosen to increase the quality of public areas. He considers that any calculations suggesting that the HA could increase flat production by increasing ER do not seem to be appropriate.

2.19 The **Secretary for Planning and Lands** has said that it is not necessarily a virtue to have an excessively high ER for buildings if this results (say) in dark, narrow corridors. The Administration is reviewing the Buildings Ordinance (Cap. 123) to encourage the provision of green features to help reduce the resources needed for buildings to function.

2.20 The **Director of Buildings** has said that the BD has issued a Practice Note jointly with the Lands Department and the Planning Department on 27 February 2001 providing incentives to allow certain common areas and green features (e.g. wider corridors and lift lobbies, sky gardens, balcony) be exempted from GFA calculations. This will not affect the ER of private projects while larger common areas are provided. With the implementation of the said incentives, the basis of comparison of ER would become different. If GFA of public housing is calculated in the same way as private projects, i.e. some common areas are excluded, their ERs will be higher when compared with those calculated before the announcement of the incentives when the common areas are included in GFA calculations (Note 6).

Response from the Chairman, HA

2.21 The **Chairman, HA** has said that:

- (a) he is concerned about the apparent misapprehension of precisely what is measured by the so called “efficiency ratio” and the application of this measure to the HA developments whose population and planning parameters are defined in consultation with Government. He has also said that the HA attaches great emphasis to the quality of public areas in its building designs in order to provide a good living environment to their residents; and
- (b) in November 2000, the HA decided to move towards a flexible housing production mix from 2004-05 onwards. In support of this new policy, the HD will adopt a site-specific layout approach to building designs. Within the constraints of Government agreed Planning Briefs, he is confident this will help ensure that the development potential of the HA’s future sites will be fully optimised (Note 7).

Note 6: With the recent announcement of the initiatives under the new Practice Note, some common areas in the HA’s standard designs will also be exempted from the GFA calculation. In Audit’s view, in order to ensure that land allocated for public housing is fully utilised, the HD should maximise the GFA allowed by incorporating into the SA the GFA which can be exempted under the new Practice Note. This will improve the ER and can increase the number of flats produced.

Note 7: Audit welcomes the HA’s decision to adopt the site-specific layout approach to ensure the full optimisation of the development potential of the HA’s future sites. This will help achieve a higher ER, while maintaining a reasonable living environment.

PART 3: TENDERING PROCESS

3.1 This PART examines the HD's tendering process, particularly the new Preferential Tender Award System (PTAS).

The HA's new tendering system

3.2 The HA operates a selective tendering system for its building projects. The HA has its own lists of contractors for various types of construction works which include piling, building and building services (e.g. lift, electrical and fire services). It only invites contractors on the HA's approved lists to submit tenders.

The Preferential Tender Award System

3.3 In September 1999, the HA introduced the PTAS for the award of building contracts. The PTAS is based on an assessment of the performance of contractors and the tender prices submitted by them. The PTAS is designed to guard against accepting low bids submitted by contractors who have performed poorly in the past.

3.4 Under the PTAS, a Preferential Tender Score (PTS) is calculated for each of the submitted tenders based on the tender sum and the contractor's past performance in the HA's projects. The weightings given to tender sum and past performance are 80% and 20% respectively. The purpose of the 80% and 20% split weighting is to ensure that both the tender price and contractors' capability are duly taken into consideration in awarding contracts. It is pertinent to note that, to ensure that contractors' past performance is compared in a quantitative manner, a prerequisite for the successful implementation of the PTAS is a reliable performance scoring system.

3.5 Up to the completion of the audit (December 2000), the HD had carried out 18 tendering exercises for building contracts using the PTAS. In three cases, the contract was not awarded to the tenderer who submitted the lowest bid.

3.6 According to the consultative paper on quality housing issued by the HA in January 2000 (see paragraph 7.2 below), the HA's intention was to apply the PTAS to all construction contracts. In other words, apart from building contracts, tenders submitted for piling and building services contracts should also be assessed by the PTAS.

Audit observations on the PTAS

3.7 Although the HA had decided to extend the PTAS to cover building services and piling contracts as well as building contracts, the progress was slow. Up to the completion of this audit in December 2000, the HD had not drawn up a plan to apply the PTAS to evaluate building services and piling tenders. The main reason for the slow progress was the lack of a performance scoring system for such contractors.

3.8 ***Building services contracts.*** Audit notes that the HD has been developing a performance scoring system for monitoring the performance of building services contractors. This system, known as Building Services Performance Assessment Scoring System (BS PASS) 2000, was originally expected to be implemented on 1 January 2000. However, up to the end of December 2000, BS PASS 2000 had not yet been implemented. Audit also notes that the HD has deferred the target implementation date by 18 months to June 2001.

3.9 ***Piling contracts.*** Meanwhile, the progress of developing a performance scoring system for piling contractors was even slower. Up to the end of December 2000, the development work of a performance scoring system for piling contractors was still in progress. The HD expected to implement the new scoring system by mid-2002.

Audit recommendations on the PTAS

3.10 **Audit has recommended that the Director of Housing should:**

- **accord priority to the implementation of the performance scoring system to monitor the performance of building services and piling contractors; and**
- **draw up an action plan to apply the PTAS for assessing future tenders submitted by building services and piling contracts.**

Response from the Administration

3.11 The **Director of Housing** has said that the development of the BS PASS 2000 was substantially completed in early 2000. The system was put into trial run between April to June 2000 to enable the HD project staff and contractors to familiarise themselves with the new system. At the end of the trial run, comments were collected. There was a common view that the HA's housing production would reach an unprecedented peak level. To allow both the HD project staff and contractors to focus their efforts on production, it was considered prudent not to fully roll out the BS PASS 2000 until the production peak was over. The HD had therefore revised the target implementation date to the third quarter of 2001. He has also said that:

- (a) contractors' performance scores will be gradually built up when the BS PASS 2000 is implemented. When sufficient scores have been accumulated for most of the contractors, the HD will apply PTAS to assess the tenders of building services;
- (b) in order to implement a performance scoring system for piling works, a list of contractors is needed. The HA has established its list of piling contractors only in August 2000; and
- (c) the development of the performance scoring system for piling contractors is nearly completed. The HD expects to put it into operation in the last quarter of 2001, initially on a trial run basis for system refinement. When sufficient scores have been built up, as a first step, the scores will be used to assess which contractors will be invited to tender for piling works. The feasibility of applying the PTAS for tender assessment will also be further explored in consultation with the parties concerned.

Probationary period of building contractors

3.12 Building contractors are included in the HA's lists of approved contractors on probation after they have been assessed to meet the established entry criteria. These criteria include financial standing, management capability and proven track records in housing construction. Other resources, such as plant and workshops, are also evaluated. Contractors with a probationary listing status are only allowed to be awarded a limited number of building contracts. Promotion to the confirmed status is subject to further performance evaluation on the HA contracts.

3.13 In November 1997, the HA shortened the probationary period of contractors from 18 months to 12 months. The objective was to ensure that there would be competition among a sufficiently large number of contractors. Also, from the risk management point of view, it was prudent not to put too much work in the hands of a small number of contractors.

Audit observations on the probationary period of building contractors

3.14 The HA's current practice of only awarding a limited number of building contracts to a newly-listed contractor is considered reasonable. However, the 12-month probationary period appears to be too short for determining whether the contractor is competent enough for promotion to the confirmed status. It is worth noting that the normal completion time for a building project is about 27 months. By the time the 12-month probationary period expires, many parts of the building project are only in their early stages of construction and some of the works have not yet commenced. Therefore, with only a 12-month working experience, it is premature to make an assessment of the contractor's overall technical and management competence. In this connection, the Works Bureau requires a probationary contractor, including a building contractor, to undergo a minimum probationary period of 24 months before it can apply for promotion to the confirmed status.

3.15 Furthermore, as the HA's housing production level will peak off in a few years' time, the need to maintain a long list of building contractors is disappearing. Audit therefore considers that it is an opportune time for the HA to review whether the 12-month probationary period is appropriate.

Audit recommendations on the probationary period of building contractors

3.16 **Audit has recommended that the Director of Housing should:**

- **critically review whether it is appropriate in the present circumstances to give newly-listed building contractors a probationary period of only 12 months; and**
- **consider extending the probationary period for newly-listed building contractors before they are confirmed to the approved lists. Consideration should also be given to extending the probationary period to the expected completion date of the relevant HA project, or to 24 months (similar to the practice of other government works departments).**

Response from the Administration

3.17 **The Director of Housing** has said that:

- (a) contractors on the HA contractor lists are well established. They are vetted for financial standing, competency and track record prior to entering the lists on probation;
- (b) contractors are not automatically confirmed at the end of the probationary period. The HD takes into consideration the aspects of performance available for evaluation before a contractor is recommended for confirmation. Since the shortening of the qualifying period to 12 months, only five contractors on probation had been promoted to the confirmed status. None of them applied for confirmation earlier than 20 months after they had been admitted to the list of contractors on probation; and
- (c) with the planned reduction in the housing production, the HA is reviewing all listing criteria, and has recently established a premier league of contractors as the basis for developing strategic partnership. The qualifying period for contractors to apply for confirmation will also be reviewed.

PART 4: PILING WORKS

4.1 This PART aims at finding out whether there is room for improvement in the HD's piling works, with particular reference to the process of carrying out foundation works using pre-stressed precast concrete (PPC) piles.

Background

4.2 In the construction of a housing block, a safe foundation is of paramount importance. The series of foundation problems discovered since 1999 at the HA's sites in Shatin Area 14B Phase 2, and Tin Chung Court, Tin Shui Wai, NT have exposed some of the weaknesses in the piling process and the monitoring system of the HD. The HA has taken measures to address the public concerns about the foundations of the HA's housing blocks, including:

- the launch of a Preventive Foundation Enhancement Programme in December 1999. The objective of the Programme was to examine the adequacy of the foundations of all 364 housing blocks in 105 projects which were then under construction. It was found that all 364 blocks had no structural safety concern caused by their foundation works; and
- the announcement of a number of initiatives to revamp the HD's piling process and to strengthen the site supervision of its piling projects. Details are listed in Appendix A, under the sub-headings "Area 2" and "Area 3".

4.3 Regarding the foundation works in Shatin Area 14B Phase 2 and in Tin Chung Court, Audit noted that the Independent Commission Against Corruption had carried out an investigation. The investigation was still ongoing as at the end of February 2001. Audit also noted that the Legislative Council appointed a Select Committee in February 2001 to inquire, among other things, into the building problems in Shatin Area 14B Phase 2, and Tin Chung Court. In connection with the foundation problems found in the HA's blocks, public concerns were also raised about the suitability of using PPC piles in areas where the geological conditions were difficult.

The HD's experience with PPC piles

4.4 PPC piles were first introduced to Hong Kong in 1980. It has a high load capacity and offers substantial savings under certain circumstances. The HD first used PPC piles in the foundation works for the Cheung Sha Wan Flatted Factories in 1982. In 1983, PPC piles were adopted for the foundation works of the housing blocks of Fu Shin Estate Phase 1, Tai Po. The HD was satisfied with the performance of PPC piles in these two pilot projects. It was estimated that by using PPC piles, the HA was able to reduce the foundation cost by 25% (Note 8). The HD also found that PPC piles performed well in all the tests that had been conducted. The HD

Note 8: *In response to the Audit enquiry, the HD staff explained to Audit that the cost difference between PPC piles and other types of piles had increased since the 1980s due to further reduction in the cost of PPC piles.*

therefore concluded that PPC piles were suitable for a wide range of geological conditions normally encountered on the HA sites.

4.5 After the pilot projects in 1982 and 1983, PPC piles were widely used by the HD for foundation works. According to a paper submitted to the Building Committee of the HA in 1987 (four years after the first pilot project), the HA had let 144 foundation contracts which used PPC piles. According to the HD's records of December 1999, in the past three years, PPC piles had been installed on 30 HA sites.

Audit examination of three piling projects

4.6 In order to assess the effectiveness of the HD's PPC piling process, in June 2000 Audit selected three PPC piling projects in Tin Shui Wai, where the geology was known to be complex and unpredictable (Note 9), for detailed examination. Of the three projects selected, two were completed in the early 1990s and one was a recent project. (The two earlier projects were selected for examination in order to ascertain whether there were particular problems in using PPC piles in areas with difficult geological conditions.)

4.7 The two earlier projects selected by Audit for examination were the **Tin Yiu Estate Phases 2 and 3** (i.e. Case study 1 in paragraphs 4.8 to 4.10 below) and the **Tin Shui Estate Phase 1** (i.e. Case study 2 in paragraphs 4.11 to 4.16 below). These two estates were among the first batch of the HA's building projects in Tin Shui Wai.

Case study 1: Tin Yiu Estate Phases 2 and 3

4.8 When the Tin Yiu Estate Phases 2 and 3 were proposed in the 1980s, the HD carried out a detailed site investigation. It found that the geological conditions of the site were complex. Significant marble formation was found. The HA, therefore, decided to let the piling contract on an "Engineer's design" basis (i.e. the foundation would be designed by the HD's engineer), so as to ensure that the contractor would not have to bear the unnecessary technical risks.

4.9 *Special conditions for using PPC piles.* In the late 1980s, when drawing up the foundation design for the Tin Yiu Estate Phases 2 and 3, the HD concluded that PPC piles should be used for some of the housing blocks subject to the following conditions:

- all PPC piles to be used would be provided with a stiffened driving shoe, for achieving penetration of dense material;
- pre-boring of appropriate piles would be carried out to remove deep obstructions; and

Note 9: *In the late 1980s, the Geotechnical Control Office of the Civil Engineering Department conducted an extensive research to assess the geological conditions of the Tin Shui Wai area. The research found that the Tin Shui Wai area had an unpredictable weathering pattern. Hardpans and cavities were found in many places.*

- trial piling and loading tests on preliminary piles would be carried out prior to the driving of working piles, in order to assess the driveability of the piles and to confirm the design assumptions.

4.10 The contract was later awarded and the estate was completed in the early 1990s. Up to the end of December 2000, no foundation problems had been reported at the Tin Yiu Estate Phases 2 and 3.

Case study 2: Tin Shui Estate Phase 1

4.11 The Tin Shui Estate Phase 1 was developed in the late 1980s i.e. about the same time as the Tin Yiu Estate Phases 2 and 3. However, unlike the Tin Yiu case, the piling contract for the Tin Shui Estate Phase 1 was let on a “design and build” basis, whereby the contractor was given the responsibility to build the foundation according to the contractor’s own design (i.e. the contractor bears the technical risks).

4.12 The Tin Shui Estate Phase 1 is located at Tin Shui Wai Area 16. This site had only been reclaimed for less than a year prior to the commencement of the foundation works. To ensure that the geological conditions of the site were properly evaluated, the HD and the contractor carried out an extensive site investigation which included the sinking of 103 investigation drillholes in 1989 and 1990.

4.13 The contractor found that the geological conditions of the site were relatively simple. The contractor considered that standard PPC piles were suitable because, based on the investigation results of sinking the drillholes, no sizeable boulders were encountered. The piling works for the Tin Shui Estate Phase 1 were eventually completed in 1990.

4.14 However, according to the Final Foundation Report of June 1990, placing of PPC piles at close spacing had caused the soil underneath the foundation to become denser as the piles were progressively driven into the ground. Because of such soil densification effect, driving of the piles at the later stage of the piling works became more difficult. A number of piling problems had been encountered. These problems included:

- **Material fatigue.** Several PPC piles were damaged at the top end due to material fatigue brought about by the repeated ramming of the diesel driving hammer on them before the piles penetrated and reached the founding depth;
- **Ground water.** Water was found in the hollow core of a number of piles, indicating that the pile shoe of some PPC piles could have been damaged due to hard driving, or encountering hard materials underground; and
- **Shallow founding depth.** A number of piles had not reached the designed depth. The contractor considered that it was not possible to drive the piles deeper because further driving of such piles would result in pile damage.

4.15 Nevertheless, the Final Foundation Report concluded that the foundation using PPC piles provided a sufficient factor of safety against failure and it could perform satisfactorily with limited settlement.

4.16 The experience gained from the Tin Yiu and Tin Shui cases shows that PPC piles could be used in Tin Shui Wai area, notwithstanding that the geological conditions were known to be complex and unpredictable. **However, such experience demonstrates that PPC piles should be used with great care.** For example, it is necessary to consider the following measures before it is decided to use PPC piles:

- carrying out extensive site investigations to ascertain comprehensively the sub-soil conditions at the site;
- ensuring that PPC piles are strengthened with stiffened pile shoes to enhance its penetration power;
- carrying out pre-boring to overcome any underground obstructions;
- in terms of work sequence within a construction site, for driving the working PPC piles into the ground, always starting from the centre of the site to ensure even soil densification; and
- installing and testing preliminary/trial piles at the beginning of the piling works, so as to be able to assess and monitor the performance of the subsequent working PPC piles under actual site conditions, and to confirm the design assumptions.

Case study 3: The project at Tin Shui Wai Area 102 Phase 3

4.17 The third project reviewed by Audit is a foundation project for four HOS housing blocks in Tin Shui Wai Area 102 Phase 3. This is a “design and build” contract. Up to the end of December 2000, the construction works of the project were still in progress. In this case, Audit found that the contractor had failed to complete the installation and testing of the preliminary piles at the initial phase of the works of the piling contract.

4.18 ***Preliminary piles were not timely installed and tested.*** The objective of installing and testing preliminary piles is to test the performance of the working piles under the actual site conditions, and to confirm the assumptions used in designing the foundation (see the third inset in paragraph 4.9 above). The piling contract for Tin Shui Wai Area 102 Phase 3 was awarded in September 1997. **According to the master work programme submitted by the contractor, a proposal for the installation and testing of the preliminary piles should be submitted to the HD by September 1997, and the works for the preliminary piles should be completed in November 1997.** However, according to the progress reports prepared by the HD’s site inspection staff, the works for the preliminary piles were delayed. Details are as follows:

Date	Event	Remarks
September 1997	Contract awarded. Contractor submitted master work programme and preparation work began.	According to the master work programme, a proposal for the installation and testing of the preliminary piles should also be submitted to the HD.
October 1997	Installation of the working piles commenced.	Proposal for the installation and testing of preliminary piles had not yet been submitted to the HD.
November 1997	Installation of preliminary piles commenced.	27% of the overall foundation works had already been completed. According to the master work programme, the installation and testing of the preliminary piles should have been completed by November 1997.
December 1997	Installation of preliminary piles was partially completed.	41% of the overall foundation works had already been completed.
January 1998	Testing of the preliminary piles was completed.	53% of the overall foundation works had already been completed.

4.19 The objective of installing preliminary piles is to test the performance of the working piles and to confirm the validity of the assumptions made in the foundation design. This is to obviate the need for making significant design changes after the main piling works (i.e. installation of the working piles) have begun, which would delay the progress of the works. Therefore, it is necessary to ensure that the preliminary piles are installed and tested at the beginning of the foundation works. Otherwise, the purpose of installing the preliminary piles would be defeated. In the case of the foundation works in Tin Shui Wai Area 102 Phase 3, there was a serious delay in the installation and testing of the preliminary piles. The installation of the preliminary piles only commenced in November 1997 **after** 27% of the overall foundation works had been completed. Furthermore, the pile testing work was only completed in January 1998, **after** 53% of the overall foundation works had already been completed.

4.20 This case illustrates that there were control weaknesses in the piling process. First, the contractor had failed to comply with the master programme it submitted on the installation and testing of the preliminary piles. Second, the HD had not taken any effective action to ensure that the works for the preliminary piles were completed on time.

Audit observations on the HD's piling process

4.21 The experience gained from the earlier PPC piling projects at Tin Shui Wai (Tin Yiu and Tin Shui cases) shows clearly that using PPC piles at building sites, where the geological conditions are known to be difficult, requires close supervision. In the case of the piling works in Tin Shui Wai Area 102 Phase 3, Audit found that effective measures had not been taken to ensure that the installation and testing of preliminary piles were completed prior to the beginning of the actual piling works. Audit therefore considers that there is room for improvement in the HD's system of site supervision so that the experience gained and lessons learned from earlier piling projects can be used to improve the HD's management of piling contractors in future.

Audit recommendations on the HD's piling process

4.22 **Audit has recommended that the Director of Housing should:**

- **develop an effective management control system for the monitoring of piling contracts (in particular piling contracts using PPC piles), and for resolving problems that may be encountered in piling works so as to prevent the recurrence of piling works problems;**
- **take action to improve the HD's working procedures (e.g. revise the operational manuals) so that the HD site staff concerned are required to properly document, and notify the HD's senior management of significant problems encountered, and useful experience gained and lessons learned from previous contracts can be applied to better manage the current and future contracts;**
- **ensure that the preliminary piles are installed at the initial phase of piling projects; and**
- **carry out proper testing of the preliminary piles to confirm the validity of the design assumptions of the foundation works, prior to the installation of the working piles.**

Response from the Administration

4.23 The **Director of Housing** has said that 50 Quality Initiatives have been developed and implemented to enhance the mechanism for the monitoring of piling contracts. These include:

- (a) conducting extensive site investigations prior to tender;
- (b) adopting the engineer's design as far as possible;
- (c) providing resident engineer to supervise the works in every piling site;
- (d) examining the risk of every piling project by Foundation Advisory Panel of the HD;
- (e) reviewing the Piling Manual and Specification by an external consultant;
- (f) employing independent pile testing firms to carry out testing; and
- (g) setting up site forums to enhance communication between project teams and contractor to share experience and resolve problems.

In addition, changes have been initiated to procurement and contract conditions which provide a more equitable sharing of the risks between the HA and the contractor. Regarding the three piling projects examined by Audit, the Director has added that:

Case study 1: Tin Yiu Estate Phases 2 and 3

- (h) at the time of construction of the foundation of Tin Yiu Estate, the "Contractor's design and build approach" was the mainstream;
- (i) because of the existence of significant marble formation, the piling contract of Tin Yiu Estate Phases 2 and 3 was let on the basis of "Engineer's design";

Case study 2: Tin Shui Estate Phase 1

- (j) the piling problems encountered in Tin Shui Estate Phase 1 had been effectively rectified by measures approved by the HD. No similar problems had been reported on the subsequent piling projects for Phases 2, 3 and 4 of Tin Shui Estate; and

Case study 3: Tin Shui Wai Area 102 Phase 3

- (k) as a general case, it is not against either contractual or technical requirements for preliminary piles not to be installed and tested at the initial phase of the works of the contract. According to the contract specification, the piling contractor is allowed to install working piles before the test results of the preliminary piles are known. If the results are affirmative, the installed working piles would then be driven to final set. If the results are negative, the contractor would revise the design parameters and submit them to the HD for approval. In other words, as long as the working piles have not been driven to final set prior to the confirmation of test results of the preliminary piles, the quality of the working piles would not be jeopardised. Such a contract provision is mainly to allow flexibility in case of tight construction programme of the piling contract. Moreover, if a number of working piles are installed smoothly, it will give more indication of the viability of driving the piles over the site (Note 10).

Guidelines for approving foundation designs using PPC piles

4.24 Audit notes that the majority of the HA's piling contracts are let on a "design and build" basis. Tenderers are required to appoint a Registered Structural Engineer to prepare the foundation design. The design submitted to the HD is vetted and approved either by the HD's professional staff or by consultants appointed by the HD.

4.25 The HD has issued an Engineering Design and Drawing Control Manual. The manual provides the HD's responsible staff with practical guidelines on checking and approving the design, calculations and drawings for the foundation design submitted by the contractors. The role played by the HD in vetting and approving designs from contractors is similar to that of the BD. (See paragraphs 6.3 to 6.6 below on the different roles played by the HA.) The BD has also issued a manual to its staff on the procedures for the approval of foundation designs and piling works of private-sector developments. By comparing the HD's manual to that of the BD, Audit has found significant differences in a number of areas. Table 2 below summarises the major differences.

Note 10: *The objective of installing preliminary piles is to assess the performance of the working piles under actual circumstances and to confirm the design assumptions, as mentioned in the last inset in paragraph 4.16 above. Audit notes that, internationally, it is the usual practice that preliminary piles are required to be installed and tested at the beginning of the foundation contract. This requirement is made predominantly for PPC piles. This is to reduce the risk of having to make substantial design changes if, after a significant portion of foundation works has been completed, it is discovered that the original design assumptions will not work.*

Table 2

Comparison of the BD's manual and the HD's manual on piling works

Description	BD's manual	HD's manual
<i>General issue:</i>		
Formulae used for foundation design	Accepts piles based on the dynamic formula	Design needs to satisfy both dynamic and static formulae
Lateral loads analysis	No specific requirement	Displacements cannot exceed 20mm
Tests	Details not described	Details described
Specific guidelines for using different types of piles	Provided	Not provided
<i>PPC pile issue:</i>		
Assessment of the effects of soil densification	Required	Not required
Examination of the adequacy and reliability of site investigation report	Required	Not required
Site with possible existence of large boulders (hardpans)	Officers are reminded to exercise great care	No special mention

Source: Records of the BD and the HD

Audit observations on the adequacy of guidelines

4.26 As far as approving foundation designs is concerned, the HD and the BD are performing a similar role of a regulatory agency. Both departments have issued technical manuals to provide guidance to their staff for approving the designs submitted. The HD's manual seems to be more stringent in general issues of piling (e.g. formulae used and loads analysis). **However, unlike the BD's manual, the HD's manual does not provide specific guidelines to deal with different types of piles.**

4.27 In the case of PPC piles, Audit considers that a set of more specific guidelines is necessary because the performance of PPC piles is often affected by the geological conditions. Without a set of specific guidelines, there is a risk, especially in those projects in which the responsible officers concerned are not familiar with PPC piles, that some important issues (e.g. effect of soil densification, existence of hardpans) would be overlooked. **Audit considers that the HD should consider, by making reference to the BD's manual, issuing specific guidelines for different kinds of piling systems, particularly for those using PPC piles.**

4.28 Audit also notes that a number of initiatives have been introduced by the HD (see paragraph 4.2 above) to improve the piling process, such as revamping the piling process and reinforcing site supervision. Audit welcomes these initiatives which would ensure better quality foundation works.

Audit recommendations on the adequacy of guidelines

4.29 **Audit has *recommended* that the Director of Housing should:**

- **critically review the HD's Engineering Design and Drawing Control Manual to see whether the existing guidelines are sufficient and specific enough for planning and supervising the entire process of piling works of the HD's projects;**
- **issue specific guidelines for different types of piling works, particularly for foundation works that use PPC piles; and**
- **take expeditious action to ensure that the initiatives for improving the piling process are implemented as soon as practicable.**

Response from the Administration

4.30 The **Director of Housing** has said that:

- (a) the roles played by the BD and the HD are somewhat different in terms of checking foundation design. The BD is basically a vetting body to assess the submissions of developers based on their submitted site investigation reports and design calculations. As a result, the BD's manual would be more "generic" in nature so that it could cover submissions of different possible soil conditions of construction projects in Hong Kong. On the other hand, the site investigations of the HD's projects are all conducted by in-house geotechnical engineers who carry out the geotechnical assessment of the sites concerned. Every geotechnical assessment is therefore "tailor-made" for the site and the geotechnical report produced also recommends on the pile types, the founding levels and the possible difficulties in installing the piles. These recommendations are then used for formulating the tender and specification requirements of the piling contract. After the tender is returned, the structural engineer and the geotechnical engineer will vet and assess the submissions based on the requirement laid down in the contract documentation;
- (b) the HA has already decided in June 2000 that PPC piles would only be accepted for use in very exceptional circumstances. The criteria for choosing PPC piles as an acceptable pile type have already been tightened and issued. Where PPC piles are proposed to be used in foundation contracts, the Contract Manager concerned has to seek the prior endorsement of the HD's Foundation Advisory Panel with respect to the justification for their use and the necessary quality control requirements; and
- (c) a series of initiatives for improving the piling process have been developed and implemented.

PART 5: MONITORING THE PERFORMANCE OF CONTRACTORS

5.1 This PART examines the HD's system of monitoring the performance of contractors.

The HD's monitoring system

5.2 The HD uses two independent systems to monitor the performance of the HA's contractors. The first system is called the site inspection, which consists of day-to-day inspections and final flat-to-flat inspections. Day-to-day inspections are carried out by site supervisory staff in accordance with defined procedures in the Site Inspection Manual and other quality control manuals. Any irregularities identified are brought to the attention of the contractor who will take action as provided for in the contract. This may include removal of sub-standard works and making payment only for works satisfactorily completed. Two final flat-to-flat inspections are carried out before the new flats are handed over to the occupants. The purpose of the inspections is to ensure that the contractors have fulfilled their contractual obligations in the delivery of new buildings, and that the contractor has rectified all defects identified. More details of the final flat-to-flat inspection are given in paragraphs 5.21 to 5.26 below.

5.3 The second system of monitoring is called the Performance Assessment Scoring System (PASS). PASS consists of three aspects which, when combined together, form the composite PASS score. The three aspects are:

- *Output assessment.* This assessment measures the contractors' compliance with the contract specifications in respect of materials and workmanship and the contract provisions for the general obligations of the contractor;
- *Input assessment.* This assessment measures the contractors' general management capability or their work capacity during the contract period; and
- *Maintenance period assessment.* This assessment measures the contractors' overall performance during the maintenance period.

PASS 2000

5.4 In 1998, the HD commenced an in-depth review of PASS. The review found that, among other things, there were a number of areas where improvements were needed. The salient points are as follows:

- ***Low sampling rates.*** The sampling rates of selecting flats for inspection were low. PASS did not always effectively reflect the overall quality of the completed works;
- ***Deficient workmanship not identified.*** PASS was unable to identify deficient workmanship, which led to latent defects after the handover of buildings; and
- ***Subjectivity and inconsistency in PASS assessments.*** There were incidents of subjectivity and inconsistency due to differences in interpretation of PASS and the specification standards.

5.5 In order to address the deficiencies identified, in May 1999, the HA gave its approval to revise PASS radically. The new system is known as PASS 2000. Its salient features are as follows:

- revised assessment procedures are introduced to ensure that the number of locations and the samples selected for inspections are increased;
- the contractor's performance in the maintenance period is taken into account to form the new composite PASS score; and
- an independent assessment team is formed to ensure that the assessments are carried out consistently.

5.6 The HA had originally planned to commence the trial runs of the new system in July 1999 and to fully implement PASS 2000 by January 2000. In June 2000, the HD decided to temporarily defer the implementation date of the new system. In October 2000, the HD decided to revise the target implementation date of the new system to June 2001. With reference to the original target implementation date, there would be a delay of 18 months.

5.7 In response to Audit enquiries, the HD explained that though the development work of the new system had largely been completed by December 1999, there was considerable follow-up work for fine-tuning the operations of the new system. Moreover, as the HD's housing production was expected to reach its peak in 2000-01, introduction of the new system would impose additional workload on the professional staff. Since the HD had not been able to deploy additional staff to handle the development work and implementation of the new system due to the tight staffing position, it was not able to implement the new system as originally planned.

5.8 Audit notes that the HD informed the HA in April 2000 that, having regard to feedback from the contractors, PASS 2000 would be rolled out as a trial scheme before a full-scale implementation.

Audit observation on PASS 2000

5.9 Audit appreciates that, as the housing production of the HD was near its peak, the HD might find it difficult to deploy additional staff resources to fine tune the development work and to implement PASS 2000 as it had originally planned. However, as PASS 2000 is expected to rectify the deficiencies of the old PASS, it is necessary to implement the new system as soon as possible. On the other hand, it is a matter of concern that the HA was not informed of the delay (see paragraph 5.8 above) until some four months after the original target implementation date of January 2000. As a good management practice, Audit considers that the HD should have informed the HA as soon as it was aware of the delay (i.e. in late 1999). This could have facilitated the HA to provide timely policy input on the remedial actions that would be needed.

Audit recommendations on PASS 2000

5.10 **Audit has recommended that the Director of Housing should:**

- **take actions (e.g. outsourcing the development work) to ensure that PASS 2000 is implemented as soon as possible; and**

- **inform the HA on a timely basis of any delays that may affect the implementation of major management control systems (such as PASS 2000) so as to enable the HA to provide necessary policy input and to make informed decisions.**

Response from the Administration

5.11 **The Director of Housing** has said that:

- (a) PASS 2000 was put to trial run between April 2000 to June 2000 so as to enable the HD's project staff and contractors to familiarise themselves with the new system. Due to the tight staffing position, the HD decided to defer the full roll out of the system until the production peak of public housing was over;

- (b) although PASS 2000 has not been fully implemented, the operation of the current version of PASS and the PTAS is maintained. An independent assessment team (formed in November 1999) has been deployed to perform two-thirds of the assessments to improve the objectivity and consistency of the monitoring system. This improvement is recognised and welcomed by the contractors; and

- (c) the HD has revised the target implementation date of PASS 2000 to the third quarter of 2001, i.e. after the production peak of public housing is over.

Using computerised system for site inspections

5.12 To ensure that the building works undertaken by the contractors conform to the contractual requirements, the HD staff carry out site inspections according to the HD's site inspection manuals. According to the manuals, site inspections have to be carried out for each and every type of works on each floor of all building projects. In cases where non-conformity is found, a second inspection will be carried out. All inspection results are recorded manually on different inspection forms. Completed inspection forms are summarised and submitted on a monthly basis to the project team stationed at the HA Headquarters.

5.13 The existing site inspection system described above is basically a manual system that involves significant amount of administrative and paper work. Audit notes that, in general, there are about 40 different types of construction works involved on each floor of a HA building project. Therefore, site inspection staff have to complete 40 different inspection forms for each floor constructed. In the case of a 35-floor block, some 1,400 (40 types of construction works multiplied by 35 floors) inspection forms have to be completed. (The figure of 1,400 is only a conservative estimate because the actual number of forms to be completed does not include the additional forms needed for subsequent inspections required for the follow-up of non-conformity cases.)

5.14 Such a large quantity of paper work and form-filling could adversely affect the efficiency and effectiveness of site inspections. In this connection, Audit notes that, at the meeting of the Legislative Council Panel on Housing held on 7 December 1999, the Hong Kong Institute of Surveyors also raised a similar concern that the HA projects had too much paper work and form-filling.

5.15 Audit notes that frequent site inspections are also required in private building projects. However, instead of relying on a manual recording system to report the site inspection results, the current trend is to use computerised systems. By using a computerised system, the amount of paper work involved can be reduced significantly. More importantly, the inspection results can be immediately transmitted electronically to all parties concerned. This can help improve the efficiency and effectiveness of the site inspections. Moreover, it allows the parties involved in the

building project to respond quickly to problems identified by site inspections. This in turn can contribute to better building quality.

5.16 Audit notes that the HA is aware of the benefits of using a computerised system for site inspections. The HA had agreed at a meeting held in May 1999 to develop a new computerised system for site inspections. The HA planned to develop a system utilising palm-top computing sets to capture and transmit data remotely from sites to the mainframe computer at the HA Headquarters for processing. The new system was expected to eliminate a significant amount of paper work and to contribute to improving the efficiency and effectiveness of site inspections. However, up to the end of December 2000, the HD had not drawn up any timetable for the development and implementation of the new system.

Audit observation on using computerised system for site inspections

5.17 Audit notes that the HD is currently using a manual system to record the site inspection results. Audit also notes that in May 1999, the HA agreed to implement a computerised system to improve its site inspection process. However, little action has been taken since then.

Audit recommendations on using computerised system for site inspections

5.18 **Audit has recommended that the Director of Housing should:**

- **draw up an action plan for the development and implementation of a computerised system for site inspections, so as to implement the system as soon as practicable; and**
- **redeploy manpower savings arising from the replacement of the existing manual system of form-filling with the computerised system to carry out more in-depth and effective site inspection work.**

Response from the Administration

5.19 The **Director of Housing** has said that:

- (a) the HD recognises that requiring all project teams to fill in a common set of inspection forms is not the best approach. As a new initiative, the HD has recently allowed flexibilities for project teams to customise the site inspection plan to suit the

characteristics and specific needs of a project. The HD expects that this will reduce the amount of paper work; and

- (b) the HD has initiated the development of a computerised system for site inspections. However, the successful implementation of such a system depends on the availability of suitable hardware and application software. The HD is accelerating the development work of the system in collaboration with contractors to facilitate exchange of information on a common platform. The HD expects that the system will be introduced later this year.

5.20 The **Director of Buildings** has said that the BD is also taking actions to implement a computerised system for site inspections.

Final flat-to-flat inspection

5.21 Under the current practice, all new public housing projects are subject to two final flat-to-flat inspections. The first final inspection is carried out by the Development and Construction Branch of the HD, when the Main Contractor reports completion of the works. The purpose of this inspection is to ensure that the contractors have fulfilled their contractual obligations in the delivery of new buildings. If the inspection result is satisfactory, a completion certificate certifying that the buildings have been substantially completed will be issued to the contractors. Upon completion of this process, the buildings will be handed over to the HD's Management Branch.

5.22 The second final inspection is carried out by the Management Branch. The purpose of the second inspection is to ensure that the new buildings are ready for occupation. The estate management staff advise the contractors of the defects to be rectified. If there are no major defects, the new flats will be allocated to the tenants or handed over to the new owners. The HA's contractors are responsible for rectification works if defects in the finish of the new flats are reported during the maintenance period of occupation, which is the 12-month period after the issue of the completion certificate.

5.23 To find out whether the current practice of carrying out two final flat-to-flat inspections is efficient and whether this delays the occupation of newly completed housing blocks, Audit randomly selected five building projects completed in 1999-2000 for examination. Audit noted that in all the five projects, the second final inspections were completed after the building had been certified complete by the Development and Construction Branch. Therefore, the new flats had to remain vacant for a period because of the need for the second inspection. Results of the audit review are summarised in Table 3 below.

Table 3

**Delay in occupying HA's completed flats
due to the two final flat-to-flat inspections**

Selected building project	Date of substantial completion certified by the Development and Construction Branch	Date of completion of the second inspection by the Management Branch	Delay due to the second inspection (Note)
	(a)	(b)	(b) - (a)
Kwai Shing East (Phase 2)	21.6.1999	26.8.1999	66 days
Lei Muk Shue (Phase 2)	7.10.1999	20.10.1999	13 days
Ko Yee Estate	8.12.1999	11.3.2000	94 days
Kwai Chung	28.1.2000	22.2.2000	25 days
Fortune Street	29.3.2000	27.4.2000	29 days
			Average: <u>45 days</u>
			(say 1.5 months)

Source: HD's records

Note: The second final inspection usually commences about two months prior to the substantial completion of the building, with a target completion date of within three weeks after substantial completion. Having regard to the practice of the private-sector developers, and the practice of the Government Property Agency and the Architectural Services Department, Audit does not consider the second inspection necessary. The delay in occupying the flats (due to the second inspection) is therefore counted from the date of substantial completion to the date of completion of the second inspection by the Management Branch.

Audit observations on final flat-to-flat inspection

5.24 Audit considers that, as quality standards are specified in the construction contracts let and administered by the Development and Construction Branch, this Branch should be responsible for ensuring that the new buildings are built to these standards by carrying out all the required final inspections. It is questionable whether the second flat-to-flat inspection is required. In Audit's view, occupation of the flats could have begun after the projects had been certified complete. The current HD's practice of requiring two final inspections by separate teams delays the handover of the new flats to the occupants. This delays the receipt of rental income from the new public rental housing flats, and the receipt of sales proceeds from the new HOS flats. Assuming that the occupation of all the flats completed in 1999-2000 had been delayed by 1.5 months (as in the five building projects mentioned in paragraph 5.23 above), Audit has estimated that the HA could have lost \$117 million (see Appendix F) in terms of rental income and interest forgone in that year.

5.25 The HA may find it useful to consider the practice used in the Government by the Government Property Agency (GPA) and the Architectural Services Department (ArchSD) in respect of new government buildings. The GPA does not carry out another inspection after the ArchSD's inspection. Instead, the GPA and the ArchSD take over the building jointly. Any defects requiring rectification are referred to the contractor via the ArchSD. The ArchSD will also monitor the quality of the rectification work. In the private sector, a similar approach is used. The developer's on-site team carries out the final inspection and works with the contractor to ensure that defects are rectified. The contractor may retain a team of workmen on site during the initial period of occupation in order to deal with any defects identified by the occupants.

Audit recommendations on final flat-to-flat inspection

5.26 **Audit has *recommended* that the Director of Housing should:**

- **draw on the experience of the joint inspection conducted by the GPA and the ArchSD, as well as the good practices of private developers; and**
- **consider combining the two final flat-to-flat inspections currently being carried out separately by the Development and Construction Branch and the Management Branch, so as to ensure that new flats are handed over to the occupants immediately after the Development and Construction Branch has certified that the flats have been completed and are ready for occupation.**

Response from the Administration

5.27 The **Director of Housing** has said that the HD has constructed benchmark sample flats to demonstrate to contractors the level of workmanship required and has tightened up the control over construction quality in completion inspections. The HA has also formed customer services teams to attend to defects reported by flat buyers to ensure that defects are rectified speedily. With the improved construction quality and the introduction of customer services teams, the HD will review the handover procedures to streamline the final flat-to-flat inspection. He has also said that:

- (a) construction works are certified complete in accordance with contract conditions, which allow for the existence of minor defects and outstanding works. These minor defects and outstanding works are to be rectified and completed by the contractors within the maintenance period specified in the contracts; and
- (b) there has been rising expectation on the quality of the flats from customers. To ensure customer satisfaction, the HD has decided to adopt more stringent inspection procedures even though they may mean delay to occupation of the flats. Housing Managers, supported by technical staff, conduct inspections on the flats from users' angle. The flats are not handed over to customers until the minor defects and outstanding works have been rectified and completed.

Response from the Chairman, HA

5.28 The **Chairman, HA** has said that he shares Audit's view that there is room for reducing the time gap between contract completion and occupation of the buildings. With the improvement of construction quality through the implementation of the HA's reform initiatives, he is sure the process will be streamlined.

PART 6: DIFFERENT ROLES OF THE HA

6.1 This PART examines the different roles of the HA in public housing project development.

Controls on new private building development

6.2 In Hong Kong, the Government has made stringent regulations and control measures for new building development. The Buildings Ordinance (BO) provides the statutory powers to the Director of Buildings (i.e. the Building Authority) to control the planning, design and construction of building and associated works. A private developer who wishes to carry out building works is required by the BO to appoint an Authorised Person, and where necessary a Registered Structural Engineer, to prepare and submit plans for the approval of the Building Authority. The developer is also required to appoint a Registered Contractor to carry out the building works. Table 4 below summarises the respective roles played by various parties in a private-sector building development project.

Table 4
Roles of different parties
in a private-sector building development project

Party concerned	Role	Remarks
Building Authority (Director of Buildings)	To control the planning, design and construction and associated works.	
Developer	Project development.	
Authorised Person or Registered Structural Engineer	Appointed by the developer to: <ul style="list-style-type: none">• plan and submit building proposals for the approval of the Building Authority;• supervise the construction works; and• ensure that the works conform to the approved plans.	Authorised Persons and Registered Structural Engineers have statutory duties to report to the Building Authority of any contravention of the building regulations. They may be subject to criminal charges if they fail to discharge their statutory duties professionally.
Contractor	Appointed by the developer to carry out the works.	Registered Contractors also have statutory duties similar to the Authorised Persons.

Source: *Buildings Ordinance*

The HA's different roles

6.3 Under sections 18(2) and 18(3) of the Housing Ordinance (Cap. 283), all the HA's building projects are exempted from the provisions of the BO. However, exemption from the application of the BO ceases once any part of a building is sold (particularly HOS flats) and the HD has been delegated the authority to exercise control of the building. All the HA's flats are only subject to the control measures and regulations established by the HA. The HA has different roles to play as far as the development of public housing projects is concerned, i.e. as the developer, the project manager and supervisor professional, and also as the regulatory agency.

6.4 The requirements of the BO in the HA projects are met by control measures that are set out in the HD's practices and procedures. In addition to the processing of building plans, other procedures are in place in the HA projects to provide checks on selection and performance monitoring of contractors and suppliers, quality of construction, site safety, completion and handover and post-completion maintenance services during the maintenance period. Table 5 below summarises the different roles played by the HA in public housing project development.

Table 5

Different roles of the HA in public housing project development

Party concerned	Role	Remarks
HA as the regulatory agency	To control the planning, design, construction and associated works.	
HA as the developer	Project development.	
HA as the project manager (professional staff of the HD and/or consultants from the private sector are appointed)	To plan and review building proposals; and to supervise the construction works.	HD professional staff or the consultants involved are not required by law to report non-conformity or contravention of building regulations to the Building Authority. There is no need to submit building plans for the approval of the Building Authority.
Contractor	Appointed by the HA to carry out the works.	HA contractors are not required by law to report non-conformity or contravention of building regulations to the Building Authority.

Source: HD's records

6.5 The HA, in fulfilling its different roles, may have conflicting functions and interests. In this connection, at a Legislative Council Housing Panel meeting held in December 1999, the Hong Kong Institute of Architects stated that:

“..... on most housing projects, the HA is acting as the developer, the designer, the project manager and the supervisor professional, and also as the Building Control. In meeting the demands of these different roles there is obvious conflict of interests”

6.6 In January 2000, the HA agreed to consult the public on the issue of putting the HA building projects under the control of the BO as one of the initiatives for providing quality housing. In April 2000, after the consultation period, the HA agreed to implement the said initiative. The HD has since held discussions with the BD and other parties concerned. However, up to the end of December 2000, no timetable or target dates for implementing such an initiative had been set.

Audit observations and recommendations on the HA’s different roles

6.7 Audit welcomes the initiative to remove any potential conflict of interest that is inherent in the current system because the HA plays different roles. To assure the public that the building projects of the HA are subject to stringent regulatory control, it is desirable to put the HA building projects under the control of the BO as early as possible. However, the HA has not established any target implementation date for such an initiative. Given that the initiative involves various parties and may have legislative, administrative and resource implications, it needs concerted efforts at a higher level in order to arrive at a practicable arrangement at an early date.

6.8 **Audit has recommended that the Director of Housing should:**

- **draw up an implementation plan for putting all the HA building projects within the purview of the BO;**
- **expedite and complete the discussions with the BD and other parties concerned on the future framework of regulatory control of the HA building projects; and**
- **periodically review the progress of the discussion on the future framework of regulatory control of the HA building projects and report to the HA for necessary policy direction.**

Response from the Administration

6.9 The **Director of Housing** has said that:

- (a) under the BO, buildings constructed by the HD and other government departments are exempted from the provisions of the BO. But this does not imply that buildings constructed by the HD are in any sense sub-standard;
- (b) the matter of third party scrutiny of the HA building projects has been acknowledged by the HA and discussed at length in the “Quality Housing — Partnering for Change” consultative document. The HA’s desire of putting its building projects under the control of the BO has been stated clearly. It has also been acknowledged that this goal requires very careful consideration by the Government;
- (c) as its first step to enhance the processing of building plans, the HD has established its own Independent Checking Unit (ICU) in November 2000. Two teams in the ICU perform formal structural and building plans vetting functions. Another team comprising experienced officers seconded from the BD performs an advisory role. The role of the ICU is to strengthen the HA projects with respect to compliance with the requirements of the BO; and
- (d) ultimately this is a matter for Government to decide, not the HA. However, consultation has taken place with policy bureaux and the BD and the full impact of placing the HA building projects within the purview of the BO is being examined. This is an extremely complex issue. It involves consideration of legislation, professional resources, administration procedures and civil service staff matters. Lengthy discussion and consultation with various government policy bureaux and other government departments, professional bodies and the construction industry are necessary before conclusions can be drawn. Interim measures to enhance existing practices are already in place.

6.10 The **Secretary for Planning and Lands** has said that he is happy to participate in expedited discussions on the regulatory control of the HA buildings.

6.11 The **Director of Buildings** has said that the BD will cooperate with the HD in their discussions of the regulatory control over the HA buildings.

Response from the Chairman, HA

6.12 The **Chairman, HA** has said that the issue of placing the HA building projects within the purview of the BO is a very complex one and ultimately a matter for Government to resolve. However, he gives an assurance that the Director of Housing will work jointly with the policy bureaux and the BD to take the matter forward. As an interim measure, an ICU has already been set up in the Director of Housing’s Office to strengthen the building control function in the HD.

PART 7: QUALITY HOUSING REFORM

7.1 This PART examines the quality housing initiatives implemented by the HA since 2000 and ascertains if there is room for improvement.

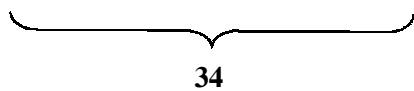
The quality housing reform

7.2 Recent incidents on defective piling works and other areas of public housing development have affected the reputation of the HA and the HD. Both the HA and the HD believe that it is imperative to initiate a series of reforms to restore public confidence. In January 2000, the HA issued a paper on quality housing for public consultation. Forty initiatives were announced and the public were invited to give their views on the initiatives.

7.3 After the consultation period, which ended in March 2000, and having considered the views of the public and the stakeholders, ten new additional initiatives were added. In April 2000, the HA endorsed a two-phased implementation plan, containing 50 improvement initiatives covering eleven different areas, to enhance the building quality. (These 50 initiatives are shown at Appendix A.)

7.4 Phase one of the implementation plan, covering 25 initiatives in six areas, aims to address immediate public concerns and is vital to customers and building safety. Phase two of the implementation plan covers the remaining 25 initiatives. The implementation plan, however, has not specified the target implementation dates for the initiatives. Table 6 below summarises the progress of implementation of the 50 initiatives as at 31 December 2000.

Table 6
Progress of implementation of
the 50 quality housing reform initiatives as at 31.12.2000

	Already implemented	Partially implemented or launched as pilot scheme	In-progress
Phase one (25 initiatives)	14	8	3
Phase two (25 initiatives)	2	11	12
	— 16 =	— 19	— 15
			
		34 =	

Source: HD's records

Audit observations and recommendations on the quality housing reform

7.5 Audit welcomes the efforts and initiatives made by the HA on quality housing. However, as can be seen from Table 6, only 16 of the 50 reform initiatives have been implemented, and 34 reform initiatives have not yet been implemented. Audit notes from the HA's Business Plan that of these 34 reform initiatives, only eleven have implementation dates specified in the Business Plan. Implementation dates for 23 reform initiatives have not yet been decided. **As a good management practice, Audit considers that it is necessary to establish a target implementation date for each initiative to facilitate the effective monitoring of the implementation plan. This ensures that any slippage is brought to light for necessary action. Furthermore, in view of the far-reaching consequences of the various initiatives, the HD should endeavour to establish a reporting system to ensure that those initiatives which are being implemented are periodically reviewed, and that feedback from the various parties concerned is obtained. Audit therefore has recommended that the Director of Housing should:**

- **set target implementation dates for all the initiatives to ensure effective monitoring; and**

- **establish a management system:**
 - (i) **to monitor the progress of implementation and to review the effectiveness of the initiatives on a timely basis; and**

 - (ii) **to obtain feedback from the various parties concerned (e.g. contractors, building professionals) and to identify opportunities for further improvement.**

Response from the Administration

7.6 The **Director of Housing** has said that:

- (a) the HD fully agrees that it is necessary to establish target implementation dates for the initiatives to facilitate the effective monitoring. The HA is keeping careful stock of progress. However, there were practical difficulties (e.g. heavy workload on staff, the need to use pilot projects for some initiatives, and the need for joint efforts of the industry for more complex initiatives) in setting specific target dates when the HD prepared the implementation plan in April 2000;

- (b) the Construction Industry Review Committee (CIRC) Report released in January 2001 has confirmed the direction and recognised the effort of the HA's on-going reform. The HD will take the CIRC recommendations into consideration for integration into the HA's reform measures and formulation of implementation programme. With the reform initiatives progressively implemented or launched as pilot schemes, the HD is well aware of the need to prepare action plans for the implementation of the remaining initiatives. This will be done by April 2001;
- (c) the HD has already established a reporting system to monitor the progress of implementation of the reform measures and to review the effectiveness of the initiatives. This is done by submitting regular reports to the HA's Building Committee (BC). Since April 2000, the HD has submitted three Quarterly Progress Reports to the BC; and
- (d) to develop the implementation details and to identify opportunities for further improvement, the HD has also taken proactive actions in obtaining feedback from various stakeholders of the industry through the partnering symposium, workshops on various subjects, sessions of site works forum, formal and informal meetings on a regular basis, etc.

Change of culture

7.7 According to a memo issued by the Director of Housing in May 2000, the HD discovered that implementing the new initiatives could not be achieved without the collaboration of the internal workforce. An internal reform was of paramount importance to align the HD's operation in housing construction to cope with the changes introduced by the initiatives and to achieve the desired results.

7.8 The Director of Housing noted that internal reforms were needed on all fronts, such as organisation and structure, systems and procedures, behaviour and culture. He recognised that making a change of culture was a difficult process.

Audit observations and recommendations on change of culture

7.9 Audit acknowledges that the HA and the HD are taking positive actions to improve the quality of public housing. However, as the systems and procedures are operated by the HD staff, it is important that all staff involved should recognise the need for providing quality housing to the public.

7.10 Audit considers that the HA should emphasise that the provision of quality housing to the public is one of the core values, and should inculcate its staff with the importance of quality housing. **Audit therefore has recommended that the Director of Housing should:**

- **include the provision of quality housing as one of the core values in the mission statement of the HA Corporate Plan; and**
- **take positive action to promote the provision of quality housing as a core value of the HA, so as to ensure that it is recognised and accepted by all staff concerned.**

Response from the Administration

7.11 The **Director of Housing** has said that:

- (a) the HD is well aware of the need to strive for continuous improvement in the provision of public housing, and would consider proposing changes to the mission statement as recommended by the Audit with a view to bringing out the commitment to providing quality housing more expressly; and
- (b) the provision of quality housing, in terms of building, management, maintenance and other housing related services, has always been one of the HA's key objectives as reflected by the mission statement in the HA Corporate Plan.

Implementation plan of the initiatives on quality housing

PHASE 1

Area 1 — Providing Quality Products and Services to Customers

1. To provide a 10-year structural guarantee to all Home Ownership Scheme and Private Sector Participation Scheme developments from the date of completion.
2. To establish an intake hot-line so that tenants/owners may report building defect conveniently.
3. To require contractors to rectify defects after intake speedily through setting up Customer Service Teams, adjusting the release of retention money by the HD and extending the defect liability period to two years.
4. To introduce short-term measures to address the production peak, such as outsourcing final flat inspection to ensure consistency of handover standard.

Area 2 — Revamping the Piling Process

5. To introduce short-term measures for safeguarding the quality of piling works.
6. To improve the quality of piling works in the long run.

Area 3 — Reinforcing Site Supervision

7. To reimburse site supervision cost for providing extra staff for enhanced requirements to safeguard the quality of supervision.
8. To deploy and maintain sufficient and competent supervisory staff by the HD, consultants and contractors on all sites during project implementation.
9. To strengthen on-site supervision by providing resident professionals for piling and large-scale building projects.
10. To streamline handover inspection procedures and define clear acceptance authority during project completion with a view to providing clear and consistent project handover standards to contractors.
11. To provide induction training to in-house and consultant site staff to reinforce site supervision.

Area 4 — Reforming Listing and Tendering Practices

12. To secure competent consultants from the tendering system.
13. To secure competent contractors from the tendering system.
14. To enhance the objectiveness and independence of the disciplinary mechanism.
15. To strengthen the representativeness and coverage of building contractors' performance appraisal system.
16. To put PASS 2000 on trial for evaluating its effectiveness.

Area 5 — Establishing a Partnering Culture

17. To reinforce the partnership relationship between the Building Committee (BC) and the HD by reviewing BC's structure and operations.
18. To reinforce stakeholders' commitments to delivering quality housing through drawing up a Quality Partnering Charter and highlighting their participation in each project by publicising their names in sale brochures and completed developments.
19. To clearly define key stakeholders' roles and responsibilities and to maximise benefits of their contributions and interaction.
20. To strengthen the communication channels with key stakeholders at the strategic level through establishing an annual partnering conference by the HA and regular workshops by the HD's directorate staff.
21. To reinforce the partnering spirit with contractors and consultants during project implementation through setting up partnering meetings and review workshops by the HD's project teams at the commencement, implementation and completion stages of the project respectively.
22. To allow sufficient time for contractors to deliver quality housing by extending the normal construction period of new piling and building works by one and two months respectively.
23. To revise contractual arrangements for achieving more equitable risk-sharing.
24. To establish "Site Works Forum" for quick resolution of site problems.

Area 6 — Re-engineering Departmental Operations

25. To reform the operations of the HD's Development and Construction Branch.

PHASE 2

Area 7 — Reinforcing Partnering Culture

26. To resolve disputes speedily during project implementation through the use of adjudication and/or Dispute Resolution Advisers in large-scale building contracts.
27. To tap customer feedback more proactively for continuous improvements.
28. To strengthen the appraisal system for consultants to enhance its objectivity and consistency and to draw up clear guidelines for performance evaluation.

Area 8 — Enhancing Quality Monitoring Assurance

29. To identify “designated sample flats” to provide realistic acceptance benchmarks for contractors to follow during construction and to produce video tapes/CD ROM for demonstrating desirable building procedures/methods.
30. To draw up a list of milestone check-points for monitoring contractors’ progress and to link up the achievement with performance appraisal and contract payments.
31. To require contractors and consultants to submit Quality Supervision Plans on project management proposals.
32. To explore the introduction of a quality warranty system by contractors.

Area 9 — Reinforcing Third Party Control

33. To introduce an objective third-party scrutiny on the HA’s buildings by putting them under the control of the Buildings Ordinance.

Area 10 — Uplifting Professionalism

34. To consider requiring contractors to employ contract workers in core trades by themselves and through their nominated sub-contractors and domestic sub-contractors.
35. To support the implementation of the Construction Workers’ Registration System for enhancing the industry’s professionalism.
36. To liaise with training authorities in providing more site management and public housing-oriented courses and continuous training opportunities for workers.

Area 10 — Uplifting Professionalism (Cont'd)

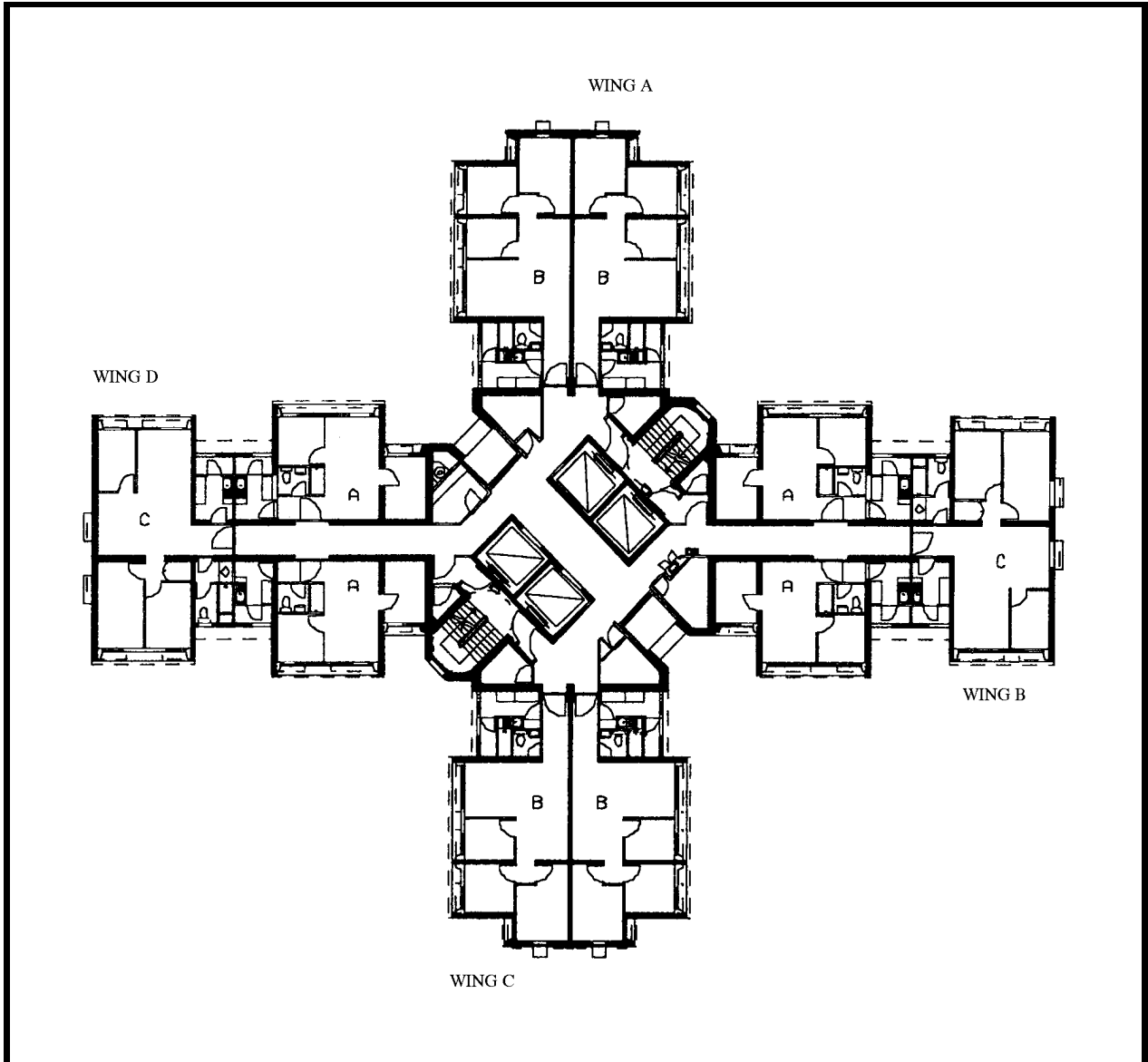
37. To uplift the professional qualifications for site supervisory staff and to increase the proportion of trade-tested workers from 35% to 60% in three years through contract requirements.
38. To strive for better site safety records by implementing the “Pay for Safety Scheme”, stipulating the minimum threshold for safety provision budget in contracts and strengthening site safety requirements in tender assessment.
39. To provide better working environment for workers by upgrading relevant contract specifications.

Area 11 — Improving Productivity

40. To promote the wider use of mechanised building process, including system formwork and prefabricated building components.
41. To promote research within the building industry.
42. To facilitate the development of an integrated production process.
43. To support the formation of an Organised Specialist Sub-contractors System and the employment of contract workers for tightening up control over sub-contracting.
44. To commission a consultancy study to analyse the causes for the relatively high construction costs for residential developments.
45. To plan for a pilot “Green Estate” for developing the concept of sustainable development.
46. To reduce construction waste and improve the environment.
47. To work with other stakeholders to uphold the industry’s ethical integrity.
48. To enhance the specification system to take on board new trade practices, reduce documentation and allow flexibility by professionals.
49. To explore “Design, Build, Operate, Transfer” concept.
50. To establish a systematic mechanism to steer the overall research strategy and oversee the use of the HA Research Fund.

Appendix B
(paragraph 2.8 refers)

Layout plan of the New Cruciform Block design

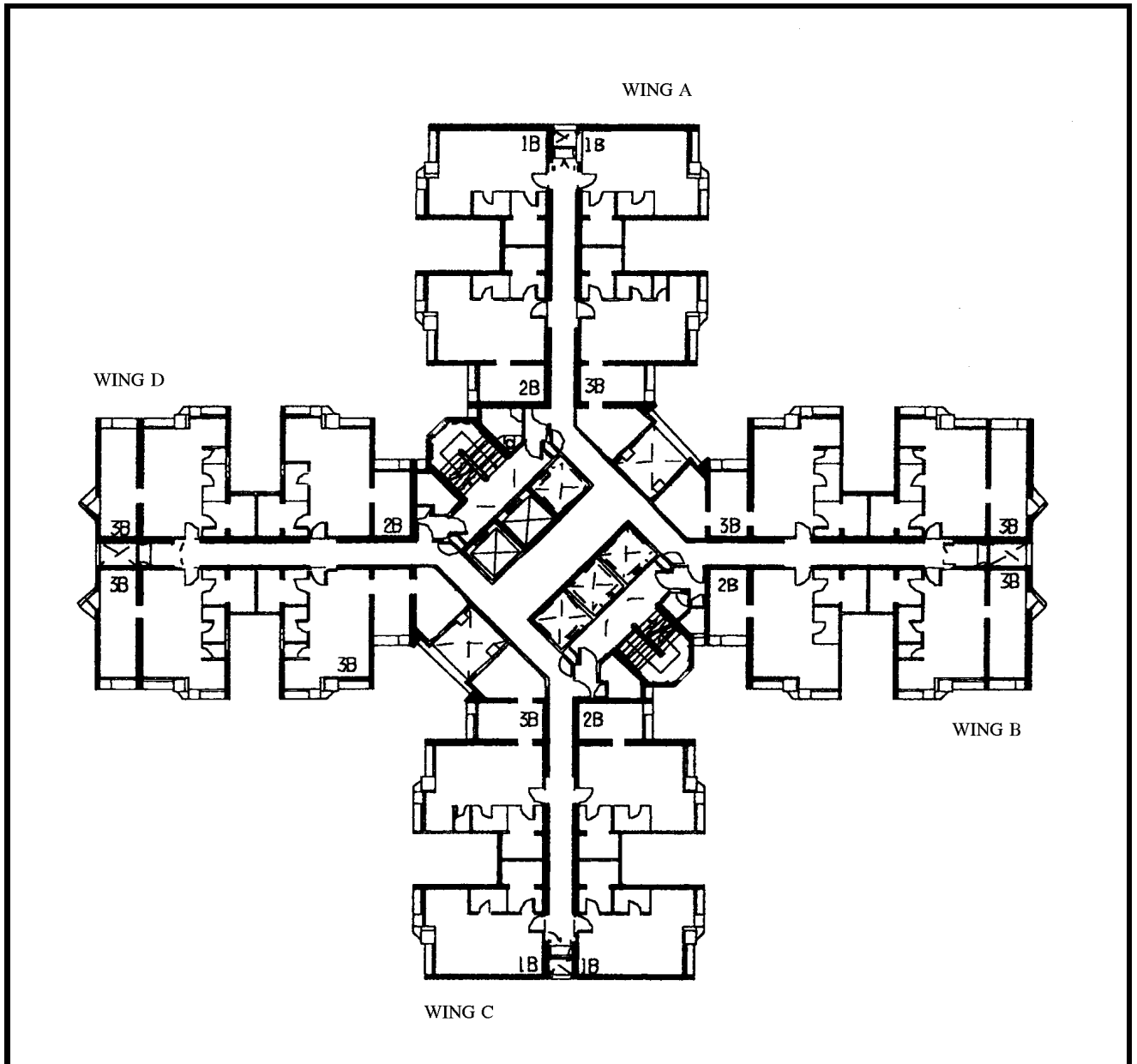


Scale: 1 : 300

Source: *HD's records*

Appendix C
(paragraph 2.9 refers)

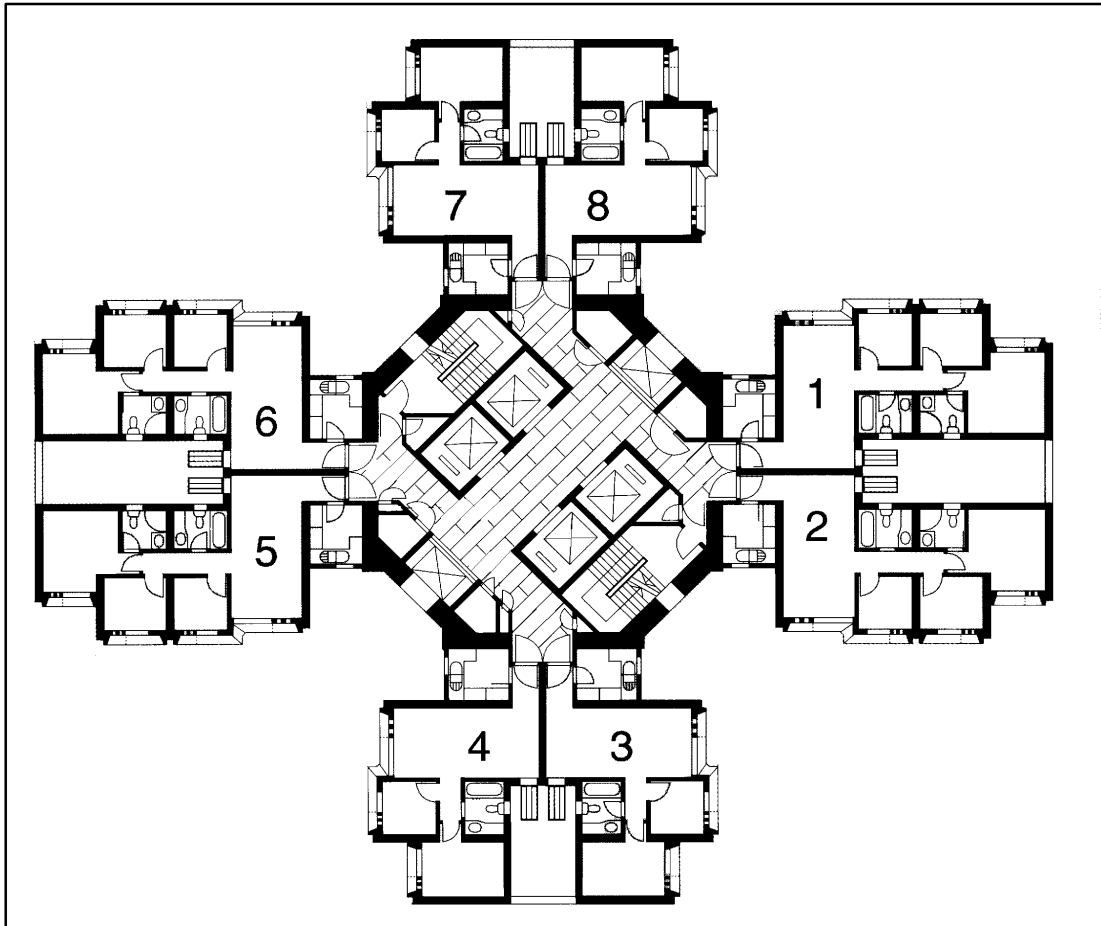
Layout plan of the Harmony One Block design
(Model: Option 7)



Scale: 1 : 350

Source: HD's records

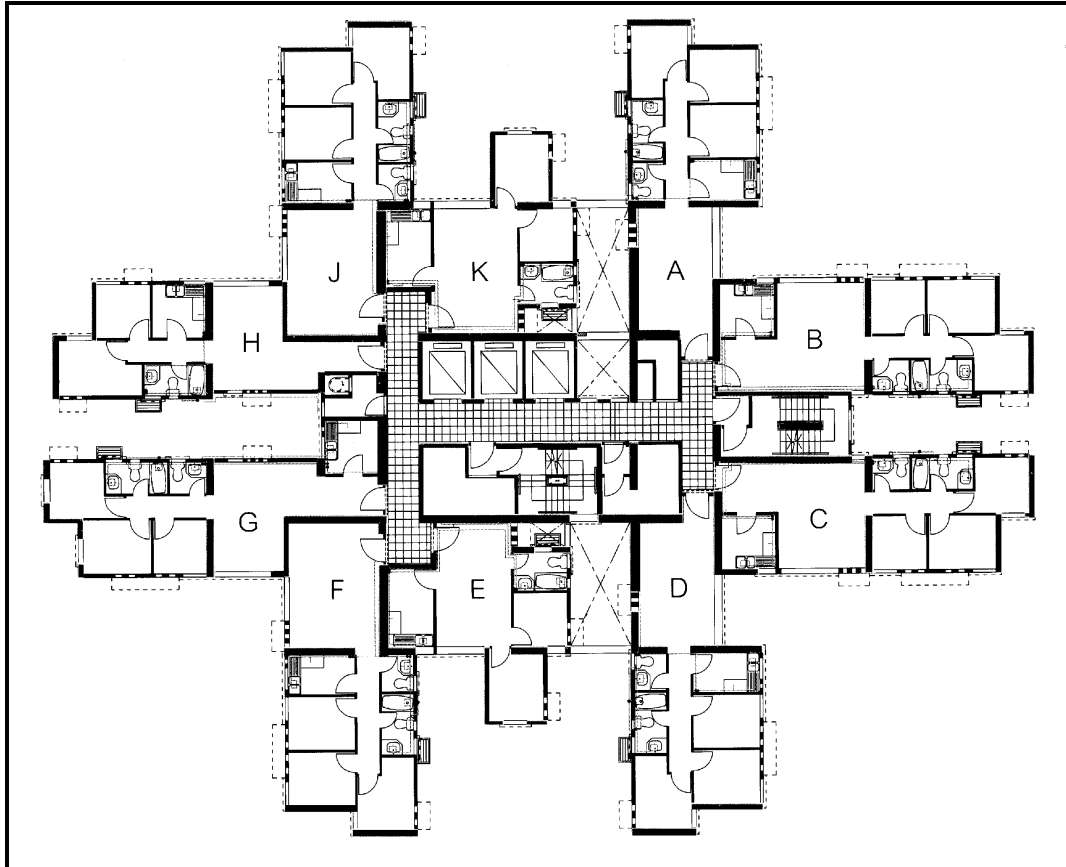
Layout plan of a Concord Block design
(Block A of Ching Wang Court)



Scale: 1 : 294

Source: HD's records

**Layout plan of a Private Sector Participation Scheme Block design
(Block 9 of Rhythm Garden)**



Scale: 1 : 294

Source: *HD's records*

**Audit's estimation of total income forgone in 1999-2000
due to delayed occupation of new housing flats**

(I) *Estimated loss of rental income from new public rental housing flats*

= (a) × (b) × (c) where:

(a) = \$1,295 being the average monthly rental of new public rental housing flats

(b) = 32,000 being the total number of public rental housing flats completed in 1999-2000

(c) = 1.5 months (see Table 3 in paragraph 5.23 of the Report) being the estimated period of delay

= \$62,160,000 (say \$62 million)

(II) *Estimated loss of interest on the delayed receipt of sales proceeds from new HOS flats*

= (d) × (e) × (f) ÷ 12 × (g) where:

(d) = \$853,000 being the average sales proceeds (after deducting an estimated 10% downpayment deposit) of HOS flats sold in 1999-2000

(e) = 13,800 being the total number of HOS flats completed in 1999-2000

(f) = 3.71% being the average savings account deposit rate in 1999-2000

(g) = 1.5 months (see Table 3 in paragraph 5.23 of the Report) being the estimated period of delay

= \$54,589,867.50 (say \$55 million)

Total estimated income forgone in 1999-2000 due to the delayed occupation of new housing flats

= (I) + (II)

= \$62 million + \$55 million

= \$117 million

Appendix G

Acronyms and abbreviations

ArchSD	Architectural Services Department
BC	Building Committee
BD	Buildings Department
BO	Buildings Ordinance
BS PASS	Building Services Performance Assessment Scoring System
CIRC	Construction Industry Review Committee
ER	Efficiency ratio
GFA	Gross floor area
GPA	Government Property Agency
HA	Housing Authority
HD	Housing Department
HOS	Home Ownership Scheme
ICU	Independent Checking Unit
PASS	Performance Assessment Scoring System
PPC	Pre-stressed precast concrete
PRH	Public rental housing
PSPS	Private Sector Participation Scheme
PTAS	Preferential Tender Award System
PTS	Preferential Tender Score
SA	Saleable area